

I CLAIM:

1. A system useful in stabilizing a vessel, the vessel including a first leg, a second leg, a third leg, and a platform coupled to the first, second, and third legs, the system comprising:

5 a first brace coupled to the first leg at a first location along the first brace, the first brace forming an acute angle with the first leg; and
an anchoring structure coupled to the first brace at a second location along the first brace, the first and second locations along the first brace defining a first brace length between them;

10 wherein at least a portion of the first brace length is located beneath the platform.

2. The system of claim 1, wherein the first brace is coupled to the first leg through a first footing structure located between the first brace and the first leg, the first footing structure being coupled to one end of the first leg.

3. The system of claim 2, wherein the first leg has at least one opening near the end to which the footing structure is coupled, and further comprising a pin having an axis, the pin positioned within the opening such that the first leg may rotate about the axis.

4. The system of claim 2, wherein the first footing structure includes one or more protrusions defining space into which material from a floor beneath a body of water collects when the footing structure contacts the floor.

5. The system of claim 2, wherein the first brace is coupled to the second leg at a third location along the first brace.

6. The system of claim 1, wherein the anchoring structure includes a winch.

7. The system of claim 1, wherein the anchoring structure includes the platform.

8. The system of claim 1, wherein one or more racks are secured to the first leg, and wherein the anchoring structure includes a holding rack configured to engage one of the one or more racks.

5 9. The system of claim 1, wherein one or more racks are secured to the first leg, and wherein the first anchoring structure includes a ring coupled to the platform, the ring having a holding rack configured to engage one of the one or more racks.

10 10. The system of claim 1, wherein the first brace is rigid.

11. The system of claim 1, wherein the first brace is flexible.

12. The system of claim 1, wherein the first brace comprises multiple loops that are linked together or wire rope.

15 13. The system of claim 1, further comprising:
a second brace coupled to the first leg at a first location along the second brace,
the second brace forming an acute angle with the first leg; and
an anchoring structure coupled to the second brace at a second location along the
20 second brace, the first and second locations along the second brace
defining a second brace length between them;
wherein at least a portion of the second brace length is located beneath the
platform.

25 14. The system of claim 13, wherein the anchoring structures coupled to the first and second braces are the same anchoring structure.

30 15. The system of claim 13, further comprising:
a third brace coupled to the first leg at a first location along the third brace, the
third brace forming an acute angle with the first leg; and

an anchoring structure coupled to the third brace at a second location along the
third brace, the first and second locations along the third brace defining a
third brace length between them;
wherein at least a portion of the third brace length is located beneath the platform.

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16. The system of claim 15, wherein the anchoring structures coupled to the first,
second, and third braces are the same anchoring structure.

17. The system of claim 1, further comprising:
10 a second brace coupled to the second leg at a first location along the second brace,
the second brace forming an acute angle with the second leg; and
an anchoring structure coupled to the second brace at a second location along the
second brace, the first and second locations along the second brace
defining a second brace length between them;
15 wherein at least a portion of the second brace length is located beneath the
platform.

18. The system of claim 17, wherein the second brace is coupled to the second leg
through a second footing structure located between the second brace and the second leg,
20 the second footing structure being coupled to one end of the second leg.

19. The system of claim 17, further comprising:
a third brace coupled to the second leg at a first location along the third brace, the
third brace forming an acute angle with the second leg; and
25 an anchoring structure coupled to the third brace at a second location along the
third brace, the first and second locations along the third brace defining a
third brace length between them;
wherein at least a portion of the third brace length is located beneath the platform.

30 20. The system of claim 19, wherein the anchoring structures coupled to the second
and third braces are the same anchoring structure.

21. The system of claim 19, further comprising:
a fourth brace coupled to the second leg at a first location along the fourth brace,
the fourth brace forming an acute angle with the second leg; and
an anchoring structure coupled to the fourth brace at a second location along the
fourth brace, the first and second locations along the fourth brace defining
a fourth brace length between them;
wherein at least a portion of the fourth brace length is located beneath the
platform.

22. The system of claim 17, further comprising:
a third brace coupled to the third leg at a first location along the third brace, the
third brace forming an acute angle with the third leg; and
an anchoring structure coupled to the third brace at a second location along the
third brace, the first and second locations along the third brace defining a
third brace length between them;
wherein at least a portion of the third brace length is located beneath the platform.

23. The system of claim 22, wherein the third brace is coupled to the third leg through
a third footing structure located between the third brace and the third leg, the third footing
structure being coupled to one end of the third leg.

24. The system of claim 22, further comprising:
a fourth brace coupled to the third leg at a first location along the fourth brace, the
fourth brace forming an acute angle with the third leg; and
an anchoring structure coupled to the fourth brace at a second location along the
fourth brace, the first and second locations along the fourth brace defining
a fourth brace length between them;
wherein at least a portion of the fourth brace length is located beneath the
platform.

25. The system of claim 24, wherein the anchoring structures coupled to the third and fourth braces are the same anchoring structures.

26. The system of claim 24, further comprising:

a fifth brace coupled to the third leg at a first location along the fifth brace, the fifth brace forming an acute angle with the third leg; and

an anchoring structure coupled to the fifth brace at a second location along the fifth brace, the first and second locations along the fifth brace defining a fifth brace length between them;

wherein at least a portion of the fifth brace length is located beneath the platform.

27. The system of claim 22, the vessel further having a fourth leg, and the system further comprising:

a fourth brace coupled to the fourth leg at a first location along the fourth brace, the fourth brace forming an acute angle with the fourth leg; and

an anchoring structure coupled to the fourth brace at a second location along the fourth brace, the first and second locations along the fourth brace defining a fourth brace length between them;

wherein at least a portion of the fourth brace length is located beneath the platform.

28. The system of claim 27, the vessel further having a fifth leg, and the system further comprising:

a fifth brace coupled to the fifth leg at a first location along the fifth brace, the fifth brace forming an acute angle with the fifth leg; and

an anchoring structure coupled to the fifth brace at a second location along the fifth brace, the first and second locations along the fifth brace defining a fifth brace length between them;

wherein at least a portion of the fifth brace length is located beneath the platform.

29. The system of claim 28, the vessel further having a sixth leg, and the system further comprising:

a sixth brace coupled to the sixth leg at a first location along the sixth brace, the sixth brace forming an acute angle with the sixth leg; and

5 an anchoring structure coupled to the sixth brace at a second location along the sixth brace, the first and second locations along the sixth brace defining a sixth brace length between them;

wherein at least a portion of the sixth brace length is located beneath the platform.

10 30. A system useful in stabilizing a vessel, the vessel including a first leg having an upper end and a lower end, a second leg having an upper end and a lower end, a third leg having an upper end and a lower end, and a platform coupled to the first, second, and third legs, the system comprising:

a first footing structure coupled to the lower end of the first leg; and

15 a brace coupled to the first footing structure.

31. The system of claim 30, the brace being coupled to the upper end of the first leg.

20 32. The system of claim 30, further comprising the brace being coupled to a winch secured to the platform.

33. The system of claim 30, wherein the brace is flexible.

25 34. The system of claim 30, wherein the brace is rigid.

35. The system of claim 30, wherein one or more racks are secured to the first leg, and further comprising a holding rack configured to engage one of the one or more racks.

30 36. The system of claim 30, wherein one or more racks are secured to the first leg, and further comprising a ring coupled to the platform, the ring having a holding rack configured to engage one of the one or more racks.

37. The system of claim 30, further comprising:
a second brace coupled to the first footing structure; and
a third brace coupled to the first footing structure.

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38. The system of claim 37, further comprising:
a second footing structure coupled to the lower end of the second leg; and
a fourth brace coupled to the second footing structure.

10 39. The system of claim 38, further comprising:
a fifth brace coupled to the second footing structure; and
a sixth brace coupled to the second footing structure.

15 40. A vessel comprising:
a platform;
three legs coupled to the platform such that the platform may be raised or lowered
along the three legs;
a flexible brace coupled to each of the three legs at a first location along each
flexible brace, each flexible brace forming an acute angle with its
20 respective leg;
an anchoring structure coupled to each flexible brace at a second location along
each flexible brace, the first and second locations along each flexible brace
defining a flexible brace length between them;
wherein at least a portion of each flexible brace length is located beneath the
25 platform.

41. The vessel of claim 40, wherein at least one of the flexible braces is coupled to its
respective leg through a footing structure located between that flexible brace and the
respective leg, the footing structure being coupled to one end of the respective leg.

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42. The vessel of claim 41, wherein the footing structure includes one or more protrusions defining space into which material from a floor beneath a body of water collects when the footing structure contacts the floor.

5 43. The vessel of claim 40, wherein the anchoring structures to which the flexible braces are coupled are the same anchoring structure.

44. The vessel of claim 40, wherein at least one of the anchoring structures includes a winch.

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45. The vessel of claim 40, wherein at least one of the anchoring structures includes the platform.

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46. The vessel of claim 40, wherein one or more racks are secured to at least one of the three legs, and wherein at least one of the anchoring structures includes a holding rack configured to engage one of the one or more racks.

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47. The vessel of claim 40, wherein one or more racks are secured to at least one of the three legs, and wherein at least one of the anchoring structures includes a ring coupled to the platform, the ring having a holding rack configured to engage one of the one or more racks.

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48. The vessel of claim 40, wherein at least one of the three flexible braces comprises multiple loops that are linked together.

49. The vessel of claim 40, wherein at least one of the three flexible braces comprises wire rope.

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50. The vessel of claim 40, wherein at least one of the three legs comprises a metal cylinder.

51. The vessel of claim 40, wherein at least one of the three legs comprises multiple trusses.

52. The vessel of claim 40, further comprising:

5 a fourth leg coupled to the platform such that the platform may be raised or lowered along the four legs; and
a fourth brace coupled to the fourth leg at a first location along the fourth brace, the fourth brace forming an acute angle with the fourth leg; and
an anchoring structure coupled to the fourth brace at a second location along the fourth brace, the first and second locations along the fourth brace defining a fourth brace length between them;
10 wherein at least a portion of the fourth brace length is located beneath the platform.

53. The vessel of claim 52, further comprising:

15 a fifth leg coupled to the platform such that the platform may be raised or lowered along the five legs; and
a fifth brace coupled to the fifth leg at a first location along the fifth brace, the fifth brace forming an acute angle with the fifth leg; and
20 an anchoring structure coupled to the fifth brace at a second location along the fifth brace, the first and second locations along the fifth brace defining a fifth brace length between them;
wherein at least a portion of the fifth brace length is located beneath the platform.

54. A method useful in stabilizing a vessel, the vessel having a platform and three or more legs coupled to the platform such that platform may be raised or lowered along the legs, the method comprising:

25 coupling a first brace to one of the legs;
orienting the first brace at an acute angle with the leg to which it is coupled; and
30 positioning at least a portion of the first brace beneath the platform.

55. The method of claim 54, wherein the coupling includes coupling the first brace to one of the three legs through a footing structure located between the first brace and the one leg.

5 56. The method of claim 54, further comprising:
coupling the first brace to an anchoring structure.

57. The method of claim 56, wherein the anchoring structure is the platform.

10 58. The method of claim 57, wherein the coupling the first brace to an anchoring structure includes coupling the first brace to the platform through a winch located between the platform and the first brace.

15 59. The method of claim 58, wherein the platform may be raised or lowered along the legs using pinions driven by one or more motors, wherein the winch is driven by a winch motor, and further comprising:
synchronizing the winch motor with the one or more motors; and
raising the platform;
whereby tension in the first brace is maintained during the raising.

20 60. The method of claim 58, wherein the platform may be raised or lowered along the legs using pinions driven by one or more motors, wherein the winch is driven by a winch motor, and further comprising:
synchronizing the winch motor with the one or more motors; and
25 lowering the platform;
whereby tension in the first brace is maintained during the lowering.

30 61. The method of claim 56, wherein one or more racks are secured to the first leg, wherein the anchoring structure includes a ring coupled to the platform, the ring having a holding rack configured to engage one of the one or more racks, and wherein the

coupling the first brace to an anchoring structure includes coupling the first brace to the ring.

62. The method of claim 56, wherein the first brace is coupled to one of the three legs at a first location, the first brace is secured to the anchoring structure at a second location, and the first brace has a first brace length defined between the first and second locations, the method further comprising:

increasing the first brace length while raising the platform.

63. The method of claim 62, further comprising:
decreasing the first brace length while lowering the platform.

64. The method of claim 54, further comprising:
monitoring deflection of one or more of the legs.

65. The method of claim 54, further comprising:
tightening the first brace when it becomes slack.

66. The method of claim 54, wherein the legs of the vessel are oriented in original positions within a body of water, the method further comprising:
lifting a leg that horizontally shifts in order to restore the original position of the leg.

67. The method of claim 54, wherein the first brace is rigid.

68. The method of claim 67, further comprising:
rotating the first brace; and
coupling the first brace to an anchoring structure using at least a pin.

69. The method of claim 54, wherein the first brace is flexible.

70. The method of claim 54, further comprising:
coupling a second brace to one of the other two legs;
orienting the second brace at an acute angle with the leg to which it is coupled;
and
5 positioning at least a portion of the second brace beneath the platform.

71. The method of claim 70, further comprising:
coupling a third brace to the third leg;
orienting the third brace at an acute angle with the third; and
10 positioning at least a portion of the third brace beneath the platform.

72. The method of claim 71, wherein the vessel includes a fourth leg coupled to the
platform such that the platform may be raised or lowered along the four legs, the method
further comprising:
15 coupling a fourth brace to the fourth leg;
orienting the fourth brace at an acute angle with the fourth leg; and
positioning at least a portion of the fourth brace beneath the platform.

73. A system useful in maintaining the position of a platform along three or more legs
20 to which the platform is coupled, one of the legs having one more or racks secured
thereto, the platform coupled to one or more pinions configured to engage the one or
more racks, the one or more pinions also configured for use in raising or lowering the
platform along the three or more legs, the system comprising:

a first holding rack configured to engage one of the one or more racks; and
25 a first holding rack actuator configured to cause the first holding rack to engage
one of the one or more racks.

74. The system of claim 73, wherein the first holding rack is attached to a ring
30 configured to surround the leg to which one of the one or more racks is secured.

75. The system of claim 74, wherein the ring rests in a recess in the platform.

76. The system of claim 74, wherein the first holding rack is coupled to the ring through the first holding rack actuator.

5 77. The system of claim 73, wherein the first holding rack actuator is a hydraulic first holding rack actuator.

78. A method of maintaining the position of a platform along three or more legs, each of the three or more legs having a lower end, the method comprising:

10 increasing the distance between the lower ends of the legs and the platform until the platform reaches a first position; and substantially maintaining the platform at the first position; wherein the substantially maintaining includes contacting at least one rack secured to at least one of the legs with at least one non-pinion structure.

15 79. The method of claim 78, wherein the at least one non-pinion structure includes a holding rack configured to engage the at least one rack.

20 80. The method of claim 78, wherein the at least one non-pinion structure includes a ring having a holding rack configured to engage the at least one rack.

25 81. The method of claim 78, wherein two or more racks are secured to at least one of the legs, wherein the substantially maintaining includes contacting at two of the two or more racks with at least two non-pinion structures, each non-pinion structure coupled to the platform, and wherein each of the at least two non-pinion structures includes a holding rack, each holding rack configured to engage one of the two or more racks.

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